AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A QCM (quartz crystal microbalance) sensor that detects an amount of a substance ~~adsorbed on a piezoelectric transducer based on a change in resonance frequency of the piezoelectric transducer~~, comprising:

a plurality of piezoelectric transducers, each piezoelectric transducer having a pair of electrodes including a first electrode and a second electrode, having respective resonance frequencies, and being adapted to adsorb said substance and change said resonance frequency;

a pair of connecting lines including a first connecting line that is commonly connected to each of the first electrodes of the piezoelectric transducers and a second connecting line that is commonly connected to each of the second electrodes of the piezoelectric transducers; and

a pair of terminals including a first terminal that is connected to the first connecting line and a second terminal that is connected to the second connecting line.

2. (original): The QCM sensor according to claim 1, each of the piezoelectric transducers having a pair of surfaces including a front surface and a rear surface, wherein

the first electrodes are disposed on the front surface and the second electrodes are disposed on the rear surface.

3. (original): The QCM sensor according to claim 1, wherein the pair of electrodes of piezoelectric transducers are connected to the pair of connecting lines in such a manner that the piezoelectric transducers are connected in parallel to each other.

4. (original): The QCM sensor according to claim 1, each of the piezoelectric transducers having a pair of surfaces including a front surface and a rear surface, wherein

the first electrodes are disposed on the front surface and the second electrodes are disposed on the rear surface, and the quartz crystal microbalance sensor further comprises

a plurality of leading wires, each leading wire leading from the front surface to the rear

surface.

5. (currently amended): The QCM sensor according to claim 1, further comprising a substrate, wherein each of a plurality of said electrode pairs forms an oscillating domain ~~electrodes that form a plurality of oscillating domains are formed~~ on the substrate.

6. (original): The QCM sensor according to claim 5, wherein each of the oscillating domains is provided with a sample holder that holds a sample in such a manner that the sample does not leak outside the corresponding oscillating domain.

7. (original): The QCM sensor according to claim 6, wherein

at least a pair of the oscillating domains is provided for each sample holder, and

one of the oscillating domains is used as a target oscillating domain in measuring the sample.

8. (original): The QCM sensor according to claim 7, wherein a sensing film that is combined specifically with a substance to be measured is formed on a surface of the electrode that is disposed in the target oscillating domain.

9. (original): The QCM sensor according to claim 5, wherein each of the oscillating domains has a different resonance frequency.

10. (original): The QCM sensor according to claim 9, wherein at least any one of area and shape of electrodes in each of the oscillating domains is different.

11. (original): The QCM sensor according to claim 5, wherein all the oscillating domains have substantially same resonance frequency.

12. (original): The QCM sensor according to claim 1, further comprising a substrate, wherein the pair of connecting lines is formed on the substrate.

13. (currently amended): The QCM sensor according to claim 1, further comprising a substrate wherein the pair of connecting lines are wired outside the substrate ~~of the piezoelectric transducer.~~

14. (currently amended): A QCM (quartz crystal microbalance) sensor that detects an amount of a substance adsorbed on a piezoelectric transducer based on a change in resonance frequency of the piezoelectric transducer, comprising:

a substrate; and

a plurality of piezoelectric transducers, each piezoelectric transducer having

a plurality of oscillating domains formed on the substrate, one of the oscillating domains ~~is~~ being used as a ~~target~~ reference oscillating domain and ~~remaining~~ another one of the oscillating domains ~~are~~ being used as a target oscillating domain for measurement of a sample;

a plurality of pair of electrodes including a first electrode and a second electrode, each pair of electrodes corresponding to each oscillating domain on the substrate to drive the corresponding oscillating domain;

a pair of connecting lines including a first connecting line that is commonly connected to each of the first electrodes of the piezoelectric transducers and a second connecting line that is commonly connected to each of the second electrodes of the piezoelectric transducers; and

a pair of terminals including a first terminal that is connected to the first connecting line and a second terminal that is connected to the second connecting line.

15. (original): The QCM sensor according to claim 14, wherein a sensing film that is combined specifically with a substance to be measured is formed on a surface of the electrode that is disposed in the target oscillating domain.

16. (original): The QCM sensor according to claim 14, wherein each of the oscillating domains has a different resonance frequency.

17. (original): The QCM sensor according to claim 16, wherein at least any one of area and shape of electrodes in each of the oscillating domains is different.

18. (original): The QCM sensor according to claim 14, wherein all the oscillating domains have substantially same resonance frequency.

19. (currently amended): The QCM sensor according to claim 14, ~~further comprising a substrate,~~ wherein the pair of connecting lines is formed on the substrate.

20. (original): The QCM sensor according to claim 14, wherein the pair of connecting lines are wired outside the substrate of the piezoelectric transducer.

21. (original): A QCM (quartz crystal microbalance) sensor device comprising:

a quartz crystal microbalance sensor that includes

a plurality of piezoelectric transducers, each piezoelectric transducer having a pair of electrodes including a first electrode and a second electrode, each piezoelectric transducer oscillating at a predetermined resonance frequency; and

a pair of terminals including a first terminal that is commonly connected to each of the first electrodes of the piezoelectric transducers and a second terminal that is commonly connected to each of the second electrodes of the piezoelectric transducers; and

a resonance-frequency measuring unit that is connected to the pair of terminals of the quartz crystal microbalance sensor and that detects an amount of a substance adsorbed on a piezoelectric transducer based on a change in resonance frequency of the piezoelectric transducer, wherein the change in resonance frequency of each of the piezoelectric transducers is caused by adsorption of the substance on the piezoelectric transducer, and calculates a mass of the substance adsorbed on the piezoelectric transducer from the change in resonance frequency measured.

22. (currently amended): The QCM sensor device according to claim 21, wherein the resonance-frequency measuring unit includes

a measuring unit that measures information of frequency dependence of combined admittance or combined impedance of the piezoelectric ~~transducer~~ transducers, and

a calculating unit that calculates the resonance frequency of each of the piezoelectric ~~transducer~~ transducers based on information measured by the measuring unit.

23. (currently amended): The QCM sensor device according to claim 22, wherein

the measuring unit measures impedance or admittance of each of the piezoelectric ~~transducer~~ transducers by sweeping frequencies in a predetermined frequency range that includes the resonance frequencies of the piezoelectric transducers, and

the calculating unit calculates resonance frequency of each of the piezoelectric transducers by calculating equivalent circuit constants of the combined admittance or the

combined impedance based on information measured by the measuring unit.

24. (original): The QCM sensor device according to claim 23, wherein the calculating unit calculates the equivalent circuit constants of the combined admittance or the combined impedance by a calculation based on a method of least squares that uses information of impedance or admittance of each of the piezoelectric transducers measured by the measuring unit.

25. (currently amended): The QCM sensor device according to claim 21, further comprising a substrate, wherein each piezoelectric transducer ~~having~~ includes

a plurality of oscillating domains, one of the oscillating domains ~~is~~ being used as a ~~target~~ reference oscillating domain and ~~remaining~~ another one of the oscillating domains ~~are~~ being used as a target oscillating domain for measurement of a sample; and

a plurality of pair of electrodes, each pair of electrodes corresponding to each oscillating domain on the substrate to drive the corresponding oscillating domain, wherein

the resonance-frequency measuring unit corrects information measured in the ~~remaining~~ another one of the oscillating domains using information measured in the ~~target~~ reference oscillating domain.

26. (currently amended): The QCM sensor device according to claim 25, further comprising a sample holder ~~that holds a~~ adapted to hold the sample in each of the target oscillating domain and ~~remaining~~ the reference oscillating ~~domains~~ domain in such a manner that the sample does not leak outside the ~~corresponding~~ target oscillating domain and the reference oscillating domain.

27. (new): A QCM (quartz crystal microbalance) sensor device comprising:

a quartz crystal microbalance sensor that includes

a substrate;

a piezoelectric transducer, said piezoelectric transducer having a plurality of oscillating domains, one of the oscillating domains being used as a reference oscillating domain and another one of the oscillating domains being used as a target oscillating domain for measurement of a sample, and a plurality of pair of electrodes, each pair of electrodes

corresponding to each oscillating domain on the substrate to drive the corresponding oscillating domain and including a first electrode and a second electrode, said piezoelectric transducer oscillating at a predetermined resonance frequency; and

a pair of terminals including a first terminal that is commonly connected to each of the first electrodes of the piezoelectric transducers and a second terminal that is commonly connected to each of the second electrodes of the piezoelectric transducer; and

a resonance-frequency measuring unit that is connected to the pair of terminals of the quartz crystal microbalance sensor and that detects an amount of a substance adsorbed on the piezoelectric transducer based on a change in resonance frequency of the piezoelectric transducer, wherein the change in resonance frequency of the piezoelectric transducer is caused by adsorption of the substance on the piezoelectric transducer, and calculates a mass of the substance adsorbed on the piezoelectric transducer from the change in resonance frequency measured, wherein

the resonance-frequency measuring unit corrects information measured in the another one of the oscillating domains using information measured in the reference oscillating domain.